

PROCESS GUIDELINES FOR SMOKED SEAFOOD PRODUCTS

Definitions

Smoking is a process of treating fish by exposing it to smoke from smouldering wood or plant materials. This process is usually characterized by an integrated combination of salting, drying, heating and smoking steps in a smoking chamber.

Smoke drying is a process in which fish is treated by combined smoking and drying steps to such an extent that the final product can be stored and transported without refrigeration and to achieve a water activity of 0.75 or less (10% moisture content or less), as necessary to control bacterial pathogens and fungal spoilage.

Process Guidelines for Smoked Fish - General

- i. All smoked fish products should be processed following a schedule developed by a process authority.
- ii. Smoked fish products must be salted prior to smoking to meet a target water phase salt content of at least 3.5%, or 3.0%, with 100-200 ppm sodium nitrite in the finished product.
 - a. The use of potassium or sodium nitrate must be within the acceptable limits per Health Canada's list of permitted food additives.
 - b. Please check out the fact sheet **Process Guidelines for Salted Seafood Products** for additional information.
- iii. Within the smokehouse, products should be arranged to prevent overcrowding or touching that could prevent uniform exposure of product to smoke and heat.
- iv. All finished smoked product should be cooled to a temperature < 70 °F/ 21 °C within two hours, further cooled to < 3.3 °C up to six hours post-smoking and maintained there throughout storage and distribution to market.
- v. Smoked seafood packaged in reduced oxygen containers must always be stored at temperatures < 3.3 °C, or else risk the growth of *Clostridium botulinum*.
- vi. Section B.21.025 of the *Food and Drugs Regulations* states that smoked seafood products packaged in reduced oxygen packaging are not permitted unless
 - a. heat-processed following a schedule appropriate to destroy all spores of *C. bot*, or
 - b. measure a salt content > 9%, or
 - c. contain product customarily cooked before eating, or
 - d. the contents are frozen and labelled "Keep Frozen Prior to Use".
- vii. Smoked seafood products are permitted to be stored at refrigerated temperatures (< 4 °C) when,

- a. *packaging* is made of material with an oxygen permeability equal to or greater than 2,000 cm³/m²/24 hrs at 24 °C and 1 atm (Oxygen Transmission Rate, OTR > 2000)
- b. *product* shelf life must not exceed 14 days from the date of packaging
- c. *processors* and/or *retailers* using these films keep records of the type of films used and their permeability

Process Guidelines for Hot Smoked Fish

Hot smoking is a process in which fish is smoked at an appropriate combination of temperature and time sufficient to cause the complete coagulation of the proteins in the fish flesh. Hot smoking is generally sufficient to kill parasites, destroy non-sporulated bacterial pathogens and injure spores of human health concern.

- i. Hot smoking should be performed with continuous temperature monitoring to ensure that all product within the lot reaches the scheduled target internal temperature.
 - a. This can be achieved by inserting a temperature-measuring device into the thickest segment of at least 3 of the largest portions being processed.
 - b. Localizing cold spots within the smoking compartment is necessary to ensure that all product reaches the targets outlined in the scheduled smoking process.
- ii. Hot smoked fish must reach and maintain an internal temperature of 145 °F/63 °C for a minimum of 30 minutes
- iii. Fish should be chilled prior to packaging.
- iv. Hot smoked product destined for vacuum packaging should be packaged at room temperature to prevent the accumulation of condensation prior to freezing.

Process Guidelines for Cold Smoked Fish

Cold smoking is a process of treating fish with smoke using a time/temperature combination that will not cause significant coagulation of the proteins in the fish flesh, but will cause some reduction of the water activity.

- iii. The cold smoking schedule should outline the smokehouse temperature, time, humidity, drying rates, drying times, the volume of moisture removed, air-flow rates and smoke contact time before/after pellicle formation.
 - a. Localizing hot spots within the smoking compartment is necessary to effectively monitor smokehouse temperatures.
- iv. Cold smoking temperatures should not exceed 90 °F / 32.2 °C.

References

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